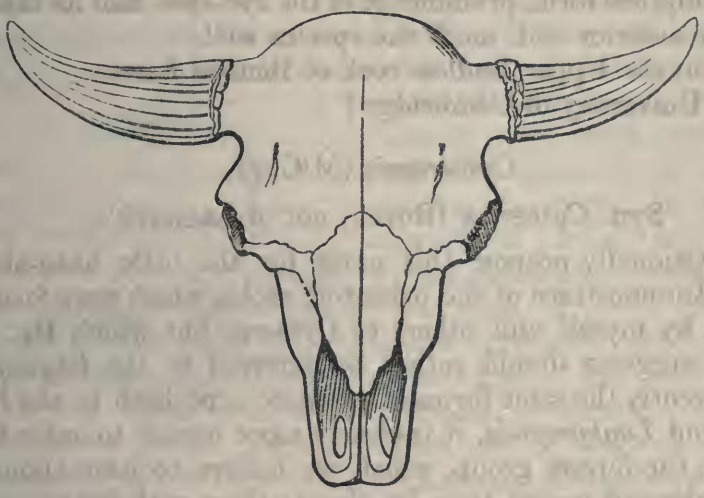
XLII.—*On the extinct and existing Bovine Animals of Scandinavia.* By Prof. Nilsson of Lund.

[Concluded from p. 355.]

4. Bison Ox (*Bos Bison*, Linn.), fig. 8 & 9.

The Wisent or the Bison of the ancients; the Aurochs of the moderns.

Fig. 8.



Bos Bison.

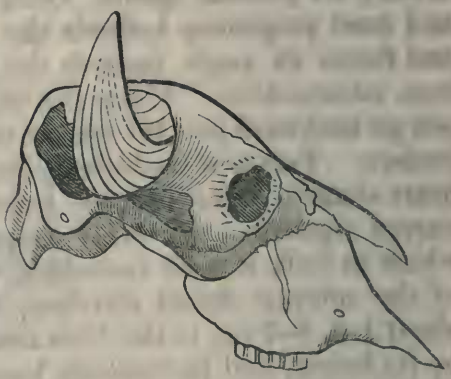
Gen. Char. The forehead convex, the distance between the crown of the horns and the orbits a little longer than its diameter. The horn-cores directed outward and somewhat backward, also curved in a direction forward upward.

Syn. *Bos Bison*, Linn. Syst. Nat. xii. 1. p. 99; Gesn. Hist. Animal. i. p. 128, with figure. *Jubati Bisontes*, Plin. viii. 15. *Bisontes setosi, colla jubis horrida*, Solin. *Villosi Bisontes*, Senec. *Bison*, Gilbert Opuscul. p. 70. *Zubr*, V. Jarocki, Versaml. der Naturforscher in Hamb. 1830, with two figures. *Bos Urus*, Eichwald, Zool. special. i. p. 342, with figures. *Auer*, Eichw. Natur. Histor. Skizze, p. 241, with figures. Idem, *Urus* (Zubr), Fauna Caspio-Caucas. p. 31. *Aurochs*, Cuv. Recherches s. l. oss. foss. iv. p. 108 *et seq.* Id. pl. 9. fig. 1, 2; pl. 10. fig. 1, 2; pl. 12. fig. 6, 7. *Aurochs des Allemands*, Cuv. Règn. anim. i. p. 279.
Fossil: Cuv. Rech. iv. pl. 12. fig. 1, 2, 4; pl. 9. fig. 5. *Bison priscus*, Owen, Brit. Foss. Mam. p. 491. fig. 205. *Uroxe tjur*, Retz. Vet. Akad. Handl. 1802, p. 280. In Lithuania: Zubr (Schuber). In Germany: *Aurochs*; *Aurthier*: in ancient times, *Wisent* or *Wisund*.

Exterior description.—This colossal Ox of former times, of whose form and locality we can judge, not from its fossil skeleton alone, but also from its yet living descendants, was in many

respects unlike not only all the foregoing, but also our tame cattle. The fore-part of the body was very thick and broad, with a high hump over the shoulders, from which the back went strongly sloping downwards; the hinder part was on the contrary quite slender and thin, so that the same proportions were far from prevailing between the fore and hind parts of the body, as in the tame ox. The legs above the knees were thick and strong, but on the contrary under the knees slender and lean. On the front of the head and under the neck was long close curly hair, which along the back of the neck formed a mane, and under the under-jaw a long beard. All the rest of the hairy covering was shorter. The head, which was carried low, was shorter and broader than that of our common oxen; the muzzle was less broad, and the nostrils were more open at the sides; the forehead between the horns about 11 inches broad and convex; the horns small, about 12 inches long; near the roots 12 inches in circumference, their direction outward and backward, thence crescent-shaped, curved forward in one and the same direction, yet sometimes the points were turned upward; in colour they are black, somewhat white-speckled. The colour of the animal dark brown or sooty brown.

Fig. 9.



Bos Bison.

Remarks.—When one sees an ox of this species, of which well-stuffed specimens are now to be found in most museums, it is impossible to admit that Cæsar could mean this animal by his *Urus*, which he describes, *specie et colore et figura tauri*, and is only distinguished from the common ox through its magnitude and *amplitudo cornuum*.

With respect to the fossil skeleton, it is thus: the forehead convex, for the most part above, between the roots of the horns; the nasal bones short, broad (only $3\frac{1}{2}$ times as long as broad; in the *Urus* they are 5, in *B. longifrons* near 6, and in the tame ox $6\frac{1}{2}$ times as long as broad), going up to the line which is drawn right over the sockets of the eyes; these are produced into tube-shaped processes. The lower, or front part of the lachrymal bones, much narrower than the upper; the distance between the orbit and the base of the horn a little longer than the orbit's diameter. The forehead upward, strongly shelving backward;

the border of the occiput lies about $3\frac{1}{2}$ inches behind the roots of the horns; at the back of this border the occiput is more transverse and not so concave as in the foregoing species of true *Bos*. The foramen of the occiput smaller towards the front, almost triangular, with the front angle obtuse. The horn-cores, resting on pedicles, are directed outward and somewhat backward, also curved in a crescent, in one direction only, which is forward and somewhat upward. The temporal cavity very small in the centre, the ends widened, the front somewhat broader than the back. *Atlas*: the wings transverse, of equal breadth in front and back, 8 in. 4 lin., with obtuse back lobes; the upper curvature strongly convex with a transverse knob in the centre; the lower with a round knob in the middle (somewhat more distant from the front than the back margin). *Epistropheus* short, broad; its process. spinos. forms a high ridge, which is highest and most projecting towards the back (its hind margin broad), and forms an angle towards the front projecting over the process. odontoideus. Along the under side is a ridge, which does not go backward past the margin of the concave posterior articular surface. Foramen medullæ spinalis in front three-sided, almost heart-shaped. The process. transversi of the cervical vertebræ curved upwards. In other respects it differs from the *Urus*, which in bulk it most resembles, through the spinous processes of the anterior dorsal vertebræ, which are longer in the *Bison*, about 1 ft. 6–7 in., in the *Urus* about 1 ft. and a couple of inches; by its larger, and particularly longer shoulder-blades; narrower rib-bones, of which it has fourteen pairs, the broadest of which is 2 in. (in the *Urus* quite 2 : 5); on the other hand it has not more than five lumbar vertebræ*.

Foram. obtur. oblong-oval. Extremities generally somewhat higher and less stoutly built than in the *Urus*. In order that we may form some idea of the magnitude of this extinct animal as compared with the present, we will insert here the measurement of some of the bones in that beautiful skeleton of a Lithuanian Aurochs, which was killed a few years ago, and presented to the British Museum by the Emperor of Russia, and a fossil skeleton of the ancient period, dug up from a turf-bog at Bjersjöholm, in southern Scania near Ystad, and now preserved in the Zoological Museum in Lund†. (Compare further the skeleton of the *Bos primigenius*, pp. 258–261.)

* The *Reindeer* has the same number of ribs and lumbar vertebræ. The *Stag*, on the contrary, has the same as the *Urus*.

† This remarkable discovery from antiquity, the like of which, as far as I know, no other museum in Europe can show, was sent as a present to the University's Museum in Lund in the year 1812, by the then possessor of the estate Bjersjöholm, Major Cock.

	(1.) Fossil specimen in the Univ. Museum at Lund.				(2.) Recent specimen in the British Museum.		
Length from the ridge of the occiput to the	ft.	in.	lin.		ft.	in.	lin.
intermaxillary bone's anterior edge	2	1	4		1	10	4
Length from the orbit to the same place...	1	1	0	near	1	0	0
,, between the roots of the horns and the orbits	0	3	4		0	3	4
Length of the nasal bones	0	9	0				
,, of the horn-cores in the curve backward	1	3	0				
Length of the horn-cores in a right line ...	0	10	4		0	8	4
,, of the under-jaw to the angle	0	17	4				
Breadth between the upper border of the roots of the horns	1	2	0		0	9	0
Breadth between the lower borders of the roots of the horns	1	3	2		0	10	4
Breadth of the orbit upwards	1	2	4		1	1	4
,, of the nasal bones, each	0	2	5				
Circumference of the horn-core at the root	0	11	4				
The line drawn between the points of the horn-cores falls behind the roots of the horns.							
Atlas : the wing's breadth	0	8	4		0	8	3
Length of process. spinos. of the second back-vertebra.....	1	7	0		1	5	6
Length of process. spinos. of the foremost lumbar vertebra.....	0	4	2		0	3	6
Length of shoulder-blade.....	1	9	0		1	6	4
Its breadth upwards	1	0	0				
Distance between the spine and the glenoid cavity.....	0	3	0				
Length : os humeri	1	3	4		1	2	0
,, radius	1	2	6		1	1	4
,, metacarpus	0	8	5		0	7	6
,, pelvis	2	1	4	near	2	0	0
,, os femoris.....	1	8	0		1	6	0
,, tibia	1	7	0		1	5	0
,, metatarsus	0	10	5		0	9	6
Least breadth of metacarpus.....	0	2	2				
,, ,, of metatarsus	0	1	7				

If we now compare this measurement with that of the *Urus*, (*Bos primigenius*) which will be found in p. 260, we shall there see, that while all the other bones in the extremities are longer in the Aurochs (*Bison priscus*) than in the *Urus*, this relation is reversed with regard to the *metacarpus* and *metatarsus* ; for these are certainly longer in the *Urus*. They are not only longer—they are also thinner, although the whole skeleton in the remaining parts is stouter. When we consider the peculiar character of these bones, namely that they are remarkable for their uncommon length and slenderness in the swift-footed deer-race ; and that the same bones also in the horse are much longer than in the ox, in proportion to the magnitude of the rest of

the body; we may hence, perhaps, with tolerable certainty conclude, that the Urus, although in general more stoutly built, and therefore stronger than the Bison, was nevertheless much swifter-footed*.

Remark: (1.)—Professor Owen has expressed a different opinion, in his excellent work 'On British Fossil Mammals and Birds,' p. 497, which, without doubt, is founded on the circumstance of the want as yet of a fossil skeleton of each species in London.

Remark: (2.)—If we measure the Bison skull, of which we have here given a drawing, with the one Professor Owen has given p. 491. fig. 205, and which he calls *Bison priscus*, we shall find a great dissimilarity, particularly in the length and direction of the horns; it does not however hinder us from seeing that it is one and the same species, since we are convinced by many data that the older the strata in which the fossil bones of the same species occur, the larger are they. Compare the remarks on *Bos primigenius*, p. 261.

Place of abode, &c.—This species of Ox, which in size formerly vied with the Urus itself, was in ancient times spread over the forests in almost all Europe, from Italy and France to the south of Scandinavia, and from England far into Asia. In all these places its fossil bones are found in the earth, but in most of them the animal itself has already long been extinct. In Scandinavia, the Bison lived contemporaneously with the Urus, yet, like the latter, it has never been found in any other tracts than in the southern parts of Scania, and there, even before the historic period, it had ceased to exist. It is true, the monk Adam of Bremen, who lived in the eleventh century, speaks of two sorts of wild oxen, the Uri† and Bubali, in the north (Adam Bremens. Chorograph. p. 32); but his accounts are evidently not to be relied upon; he places them in Lapland's northern tracts, and in Sweden proper‡, where it is certain they were never found; which shows that they were not met with in the parts he visited and was acquainted with, and that his account either was grounded on tradition, or derived from other places and times long since past.

To conclude: from the few fossil bones hitherto found in

* It ought to be remarked, that the old Romans, who saw this colossal animal in the arena at Rome, characterized the Urus not only for its superior strength, but also for its superior swiftness, "excellenti vi et velocitate Uri." *Plin.*

† It is to be remarked he makes the *Uri* to live in the water, like the *White Bear*.

‡ It is to be remembered that *Adam of Bremen* never reckoned *Scania* as belonging to *Sveonia*, but always to *Dania*; though he nowhere speaks of wild oxen being found in his *Dania*—the only place in which it ever occurs in the north.

Scania's turf-bogs, the Bison was much less common there than the *Bos primigenius* and *Bos longifrons*, whose fossil remains are found in much greater number. The few fossil bones of the Bison which have hitherto been noticed with us, consist of one old and one young cranium, and also one skeleton, all which have been dug up from a turf-bog in the districts of Skytts and Herresta, therefore in the most southern districts of the country. It ought also to be observed, that in Denmark numerous fossil bones of the *Urus* have been found, but hitherto not one single bone of the *Bison* has been discovered.

In a great part of Europe this colossal Ox has existed during the historic period; but in the English isles it appears to have been extinct already at the time they were first known to history. For in Cæsar's time, when the Roman legions traversed the forests of France, part of Germany and Belgium, they there found both the Bison and the Urus; but in no place is it mentioned that the victorious Romans in England met with any species of large wild ox; which seems to show that both the Urus and Bison were already extinct in that country. On the continent, where they continued to be found in the large wild forests even long after Cæsar's time, they seem to have disappeared by degrees, through the increase of population and culture, first in the west and afterwards in the more eastern tracts of the country. In the Vosges and the Ardennes, wild oxen were found even in King Gontram's time; and history informs us that he put to death one of his chamberlains, the nephew of the same, and a forester, because, without permission, they shot a Bubalus (Wild Ox) in the Vosges (Cuv. Recherches, iv. p. 117). In the Wilkina Saga*, hunts are described in the forest of 'Walslunga' (probably the forest of Thuringia) and the 'Ungara' forest, in which several young (ten), and one old and very large Visunt were killed. One sees by this whole account that princes hunted these large animals in their forests, and were exceedingly careful of them. In the old *Leges Allemanorum* (from the 6th and 7th centuries) it is enacted, that if any one stole or killed a Bison, Buffalo (Urus ?), or *Deer*, he should be mulcted in a large sum of money (see Baer in Wiedem. Arch. 1839, p. 75). In the poem of the Nibelungen from the 12th century, the Bison is spoken of (Visent) as among the animals which were killed at a hunt in the forest near Worms: Lucas Dawid relates in the 'Preussens Kronik,' that about the year 1240 there was found in the land much game, consisting of *Uroxen*, *Visents*, wild *Horses*, *Elks* and others (see Baer, *ut sup.* p. 71). The prince Wra-

* Peringskiold's edition, Stockholm, 1715, p. 229. Peringskiold translates, quite improperly, *Visunt* by *Kronhjort* (Crown-deer), which misrepresents the meaning of the Saga.

tislaf V. killed, at a hunt in Hinter-Pomerania about the year 1364, a "*Wysant*," which was stronger and larger than an Urus. In East Prussia, between Liebau and Tilsit, the Bison was found as late as the last century; and formerly it was found in the whole of Lithuania, even in the neighbourhood of the city of Wilna (Eichwald, *loc. cit.*). In the forest of Bialowieser in Lithuania, Augustus III. king of Poland held a great hunt on the 27th Sept. 1752, in which were killed forty-two Bisons (!) and thirteen Elks. In ancient times the Bison was also found in the north of Greece, Macedonia and Thrace. In Aristotle's "Bonasos," which is found in Pæonia, that part of Thrace now called Bulgaria, we easily recognise the Bison (Cuv. *l. c.* p. 111), which formerly was also found in Moldavia; and it is probable that the story of the giant-like ox, which Philip of Macedon killed at the foot of Mount Orcli, and whose hide he hung up together with the horns in the court of the temple of Hercules, belonged to this same species.

The Bison is now found on the wooded northern side of Mount Caucasus, where it appears to exist in large numbers, and is an object of the chase to the Tscherkesser and Abschaser, in whose language it is called *Dombei* or *Adompe*. In Moldavia and in the Carpathian mountains it is no longer found. Now that it is no longer to be met with in East Prussia, it is more and more confined to the forests of Lithuania. At the present time it is only found in one large forest, Bialowesha, where in a wild state it is enclosed and preserved by the command of the Emperor of Russia. As this colossal animal formerly lived also in the forests of southern Scania, it may not be uninteresting to know the nature of the place where it now lives and what manner of life it there leads*.

Bialowesha-forest, which lies on a large level expanse, is surrounded by plains, comprising 5 Swedish miles in length and 4–4½ in breadth. The forest consists chiefly of fir and pine trees interspersed with birch. Grassy pastures are there not unfrequent; but in many places the ground is swampy, and almost a twelfth part consists of reedy fens. Here the Elk chiefly takes up its abode; but these fens are avoided by the Bisons, who on the contrary seek high land with aromatic grass, also sharp and bitter herbs; they likewise gnaw off the young bark of trees; in the spring they consume the young leaves of the lime, poplar, elm, and willow, but not the leaves of birch or oak, and least of all the leaves of the pine. On the other hand they devour some sorts of mosses: they always avoid places without trees or that are cultivated; they never go into fields, but keep in thickly

* What I have here communicated is mostly taken from Eichwald's Nat. Hist. p. 211.

grown forests. In winter they rarely leave the pine forests; they lie still during the day, and at night go out in search of food. They seldom seek water, sometimes not for a whole day; rarely they approach the small forest-rivulets, but usually drink out of the small puddles in the forest. If pursued, they can swim easily. They live to the age of ten to twelve years in small herds of twenty to forty; the old ones separate themselves from the herd and live apart. During the rutting time they again join the herd, and live with them all through the month of August.

The Bison is more timid than bold; it is frightened at bright colours, particularly red, and will run away from it. Only when provoked will it attack man; though not always the assailant who has irritated him, but him who happens to be nearest. Its pace is not lasting; it cannot run more than from half to one verst (900 to 1800 ells) without being so tired that it must rest. The further it is chased, the oftener it stops and stretches out its blue tongue to get breath. Three wolves can kill him.

The scent of the Bison is extremely acute, and they scent a man at a considerable distance. Far off, their stamping and roaring may be heard, as they stand in the thick wood-land, and as soon as they perceive any danger they flee into the forest with a tremendous rush, throwing down or breaking numbers of trees that stand in their way as they pass them. They run with depressed head and tail raised. During the rutting time they are very much given to frolic; thus they drive one of their horns into the ground, and in that position run round a young tree till it becomes loose and falls on their heads. In this manner they will uproot trees of 4–6 inches in diameter; and as they generally get their horns entangled in the roots, they run about with this "nuptial wreath" on their heads, and thereby make a great rattling and rustling in the forests. Where they have remained for any time, they leave behind them a smell something between violets and musk.

Their rutting time is in August, and lasts two or three weeks; during this period violent conflicts take place between the bulls, and they often wound each other mortally*. Their offspring are but few, for among forty full-grown animals one sees not more than four or six of a year old. A natural enmity exists between them and common cattle, and never will a Bison pair with a tame cow. He runs away from her, or kills her with his horns. He cannot bear her presence, while her exhalation is most repugnant

* The fossil skeleton of the Bison, which is found in our museum here, shows that the animal during its lifetime had many ribs broken, probably by being pierced with horns, but which by means of the callus had again healed.

to him. Hence we may conclude that the Urus and Bison never lived together in the same tracts; perhaps seldom in the same forest.

Having thus, from the fossil bones which are found in our post-pliocene strata, given a short account of the Wild Ox, which with us is now extinct, it remains to speak of our *tame horned cattle*, of which several perceptibly different races occur with us; and, as far as we are able, to indicate from which wild species each tame race chiefly derives its origin. These investigations are however rendered particularly difficult by the circumstance, that the tame races by crossings are so mingled, that their original stock is sometimes scarcely to be recognised.

As a beginning we may notice, that it is solely from the division of the Ox family which have a flat forehead with the horn-cores sitting at the extremity of the edge between the forehead and the nape, that our tame cattle spring; and that the ox with a convex forehead, the Bison, which no one could ever make to pair with a tame cow, has not in the least contributed to the formation of any tame cattle. Besides, we can take for a given and general rule, that the tame race is always less than the wild species from which it springs.

We believe we come nearest to the truth in this difficult subject, if we assume—

1. That the *large-sized lowland races*, with flat foreheads, and for the most part large horns, descend from the Urus (*Bos primigenius*) and at length came into the country with a race of people who immigrated from the south and west.

2. The somewhat small-growth highland races, with high occiput and small or no horns, descend from the *High-necked Ox* (*Bos frontosus*).

3. How far the small-grown hornless *Finn ko* race (Noring, pp. 213–229) descends from the *Dwarf Ox* (*Bos longifrons*, Owen), may be more fully determined through future investigations.

Notices of the Wild Oxen of Britain in the Historians of the Middle Ages.

In the third volume of the 'Annals,' p. 356, will be found, besides the notice from a MS. record communicated by Sir P. Grey Egerton, a passage also from the Lives of the Abbots of St. Albans by Matthew Paris, in which he mentions the wild cattle of the forests of the Chiltern district. To these may be added the following:—

Fitzstephen, whose *Descriptio nobilissimæ civitatis Londoniæ* was written about the year 1174, thus describes the country beyond the suburbs: "Proxime patet ingens foresta, saltus nemorosi, ferarum latebræ, cervorum, damarum, aprorum, et taurorum sylvestrium."

Upon which passage Dr. Pegge, in his edition, observes: "These bulls were probably buffaloes; see King Cnut's Constitutiones de Foresta in Spelman's Glossary, p. 241," [more correctly given in Thorpe's Ancient Laws of England, 8vo. vol. i. p. 429. c. xxvii.] The passage is as follows:—"Sunt et alia quam plurima animalia, quæ quanquam inter septa forestæ vivunt, forestæ tamen nequaquam censeri possunt, qualia sunt *bubali*, vaccæ, et similia." Dr. Pegge adds:—"The forest of Middlesex was not deaforested till A. 1218, Hen. III. This forest is not mentioned in the Catalogue of forests given us by Spelman in his Glossary; *Enfield chace*, however, is thought to be a small remainder of it." He also cites the following authorities:—"Whitaker's History of Manchester, p. 340. 'The wild cows and bulls of the country continued very frequent among us in the 4th century, and even for several ages afterwards. These were merely of the usual size, but all milk-white in their appearance, all furnished with thick hanging manes like lions, and almost as fierce and savage as they.' Boëtii Scot. Reg. Desc. fol. 6, and Leslæi Hist. p. 18; and hence is the popular story of the fierce wild cow of Dunsmore in Warwickshire, slain by Guy Earl of Warwick."

Whitaker gives several passages from Roman authors relative to the animals of Britain.

The Charter of Hen. I. recognises the right of the citizens of London to hunt not only in Chiltern, but in Middlesex and Surrey.

R. T.

XLIII.—*On two new species of Testaceous Mollusca.*

By William Clark, Esq.

To the Editors of the Annals of Natural History.

Gentlemen, Norfolk Crescent, Bath, Nov. 1, 1849.

I beg you to record the discovery, by myself, last summer, of two new species of Testaceous Mollusca in the coralline zones of the Devon coast, at Exmouth. I have submitted these discoveries to the ordeal of an examination by my friends Messrs. Jeffreys and Barlee, to whom I believe every British shell is familiar, and I have their united testimony that the shells in question are entirely new to them: such a test, from gentlemen of the highest authority in conchological statistics, affixes the impress of almost certainty that these objects are novelties.

Skenea Cutleriana.

S. testa suborbiculari, albida, aliquantulum producta, anfractibus tribus spiraliter exaratis; striis subtilibus, undatis, transversis, hic et illic sparsis, notata; sutura simplex; apertura subrotunda, integra, superne in canalem brevissimam desinens; umbilicus inconspicuus, margine columnari paululum obtectus; animal et operculum adhuc latent. Longitudo et latitudo circa $\frac{1}{8}$ unciæ.

At first view I thought that this elegant minute species might